REMARKS/ARGUMENTS

The undersigned thanks the Examiner for the courtesy of a telephone call on May 2, 2005 to clarify which signals in the Wu reference (U.S. 6,227,114) are referred to as unsafe messages in the Office Action of January 7, 2005 and which signals are referred to as safe messages in the same Office Action. With respect to the Wu reference, an unsafe message is a detonation signal having a wavelength that can cause a detonator to fire. Safe messages include signals having wavelengths that cannot cause a detonator to fire and those which are used to detect whether detonation has occurred (as alluded to at col. 3, lines 53-59).

Claims 1-2, 5-8, 11-23 are currently under consideration, with claims 3-4, and 9-10 being withdrawn from consideration.

THE REJECTIONS

The 102(e) Rejection

Claims 1-2, 5-8, 11-12, 14-16, 18, 20 and 22 were rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6, 227.114 to Wu et al. The Office Action states:

> Referring to claims 1, 5-7, and 14 Wu et al. discloses a method and system for controlling a blasting network including an assembly of detonators-at 40-44, the blasting network being in a blasting system which further includes a control unit-at 36, and a communication link-at F, 30-34, C_1-C_n and 50-54, for transmitting messages between the control unit and the assembly of detonators, the messages consisting of safe and unsafe messages-see for example columns 3-4, the method including the steps of designating at least one message as unsafe-see for example column 3, lines 60-67 and column 4 lines 1-31, placing the communication link in a control mode in which the communication link is monitored for the designated at least one unsafe message in the control mode preventing the designated at least one unsafe message from reaching the assembly of detonators-see for example at 60-64 and in column 3, lines 60-67 and column 4 lines 1-31, and placing the communication link in operational mode in

which the designated at least one unsafe message is allowed to reach the assembly of detonators-see for example column 3 lines 60-67 and column 4 lines 1-31, and wherein in both the control mode and the operational mode the safe messages are permitted to be transmitted to the assembly of detonators via the communication link-see for example columns 3-4. Wu et al. further discloses the step of designating at least two unsafe messages-see for example column 3 lines 60-67 and column 4 lines 1-31.

Referring to claims 2 and 8, Wu et al. discloses wherein in the control mode of the communication link the or each unsafe message is prevented from reaching the assembly of detonators by preventing the onward transmission of the unsafe message-see at 60-64 and column 3 lines 60-67 and column 4 lines 1-31.

Referring to claims 11 and 15, Wu et al. discloses the control unit-at 36, is capable of generating legal unsafe messages, which are transmitted via the communication link in its operational mode-see for example columns 3-4.

Referring to claims 12 and 16, Wu et al. discloses the monitoring device is a filter-at 60-64.

Referring to claims 18, 20 and 22, Wu et al. discloses a method and system of controlling a blasting network including an assembly of detonators-at 40-44, the blasting network being in a blasting system which further includes a control unit-at 36, and a communication link-at F, 30-34, C_1-C_4, and 50-54, for transmitting messages between the control unit and the assembly of detonators, the messages consisting of safe and unsafe messages-see for example columns 3-4, the method including the steps of designating at least one message as unsafe-see for example column 3, lines 60-67 and column 4 lines 1-31, placing the communication link in a control mode in which the communication link is monitored for the designated at least one unsafe message in the control mode preventing the designated at least one unsafe message from reaching the assembly of detonators-see for example at 60-64 and in column 3, lines 60-67 and column 4, lines 1-31, and placing the communication link in operational mode in which the designated at least one unsafe message is allowed to reach the assembly of detonators-see for example column 3 lines 60-67 and column 4 lines 1-31, and wherein in both the control mode and the operational mode the safe messages are permitted to be transmitted to the assembly of detonators via the communication link-see for example column 3-4. Wu et al. further discloses the step of designating at least two unsafe messages-see for example column 3 lines 60-67 and column 4 lines 1-31. Wu et al. further discloses a locking device-at 60-64, to place the communication link in the control mode or operational mode-see for example columns 3-4.

Wu et al. discloses a trigger or detonation system including an optical source, an optical fiber, and one or more light trigger or detonation devices. The unsafe messages of Wu et al. are light messages having sufficient intensity and the proper wavelength(s) to activate the light trigger or detonation devices. Although several of the systems of Wu et al prevent detonation signals not having the proper detonation wavelength from reaching a given light trigger or detonation device, these systems do not prevent an unsafe message of the proper wavelength sent by the optical source from reaching a given light trigger or detonation deice. This is explained in more detail below with respect to the systems of Figures 1, 4, 5, 7 and 8. Therefore, Wu et al. does not provide a control mode in which at least one unsafe message is prevented from reaching a network of detonators. As a consequence, the systems of Wu et al. lack an important safety feature of the present invention.

Referring to Figure 1, Wu et al. operates by providing a source and control device 36 from which an optical signal is transmitted into the fiber F. Referring to coupler C_2, for example, light having a trigger or detonation wavelength γ_2 is reflected by the Bragg Grating 32 back into the circulation coupler C_2, while all other wavelengths are allowed to pass down fiber F to the subsequent circulation couplers C_n. This is all described at column 2, line 48 to column 3, line 27. The communication link from the circulation coupler C_2 to the light trigger or detonation means 22 includes a pass band filter 62. The pass band filter is described at column 3, line 60 to column 4, line 30 and, as stated at column 4, lines 1 and 2, is there to prevent accidental detonation from stray reflected optical signals. For this reason, the pass band filter 62 is able to pass light of the restricted wavelength γ_2, but not light of any other wavelength. As stated at column 4, lines 20 to 24, "in operation, the pass band filter in Fig. 3A (ie the pass band filter 62) is designed so that optical light having a wavelength γ_2 is

transmitted (see Fig. 3C), while all other optical light having wavelengths other than the wavelength γ_2 are not transmitted". The light of limited wavelength γ_2 that is transmitted by the pass band filter 62 is known as the pass band filter fiber Bragg Grating optical trigger or detonation signal (column 3, line 67 to column 4, line 1). This signal is used to trigger the light trigger or detonation means 22 for triggering or detonating the device 42, which may be an explosive charge of dynamite, as described at column 3, lines 28 to 52. The communication link may also include a further very low reflectivity Bragg Grating 52, as described at column 3, lines 53 to 59 and at column 5, lines 59 to 67. The presence of light reflected from fiber Bragg grating (FBG) 52 indicates that the detonator has not yet fired. Because FBG 52 is of very low reflectivity, some light having a trigger or detonation wavelength such as γ_2 passes through FBG 52 to the light triggered detonator 22. In sum, once a signal of light having a trigger or detonation wavelength such as γ_2 is generated by the optical source, it is not prevented from reaching its respective light trigger or detonation means. Therefore, the embodiment of Figure 1 does not prevent an unsafe message from reaching the assembly of detonators.

In Figure 4, light having a trigger or detonation wavelength γ_2 is reflected by the Bragg Grating 32 back into the circulation coupler C_2. Light from circulation coupler C_2 passes directly to the dynamite. Therefore, once a signal of light having a trigger or detonation wavelength such as γ_2 is generated by the optical source, it is not prevented from reaching its respective detonator. The embodiment of Figure 4 also does not prevent an unsafe message from reaching the assembly of detonators.

In Figure 5, light having a trigger or detonation wavelength γ_2 is reflected by the Bragg Grating 32 back into a directional coupler T_2. Some light from directional coupler T_2 passes through passband filter 262 to detonation means

22. Therefore, once a signal of light having a trigger or detonation wavelength such as γ_2 is generated by the optical source, it is not prevented from reaching its respective detonator. The embodiment of Figure 5 also does not prevent an unsafe message from reaching the assembly of detonators.

In Figure 7, the detonation system includes one or more multimode fibers for providing multimode optical trigger or detonation signals to deliver energy to the one or more light trigger or detonation means (col. 4, lines 62-65). Figure 7 shows that these multimode trigger or detonation are delivered directly from the source and control device 36 to the detonation means. The system may also include one or more single mode fibers for providing one or more single mode optical trigger or detonation monitoring signal. Therefore, once a trigger or detonation signal of light is generated by the optical source, it is not prevented from reaching its respective detonator. The embodiment of Figure 7 also does not prevent an unsafe message from reaching the assembly of detonators.

In Figure 8, light having a trigger or detonation wavelength γ_2 is reflected by the Bragg Grating 32 back into the circulation coupler C_2. Light from circulation coupler C_2 passes to photodetector 412 and transducer 422. Therefore, once a signal of light having a trigger or detonation wavelength such as γ_2 is generated by the optical source, it is not prevented from reaching its respective transducer. The embodiment of Figure 8 also does not prevent an unsafe message from reaching the equivalent of the assembly of detonators.

Claim 1 relates to a method for controlling a blasting network and requires that in the control mode the designated at least one unsafe message is prevented from reaching the assembly of detonators. In the Wu reference there is no control mode in which the unsafe message, once generated, is prevented from reaching the assembly of detonators. Therefore, Wu et al. does not teach all the limitations of claim 1 and Applicants respectfully request reconsideration

and withdrawal of the rejection of claim 1. Applicants also request reconsideration and withdrawal of the rejection of claims 2 and 5, which depend from and incorporate all the limitations of claim 1.

Claim 6 relates to a method for controlling a blasting network and requires that in the control mode the designated unsafe arm and fire commands are prevented from reaching the assembly of detonators. As previously discussed, in the Wu reference there is no control mode in which the unsafe messages, once generated, are prevented from reaching the assembly of detonators. Therefore, Wu et al. does not teach all the limitations of claim 6 and Applicants respectfully request reconsideration and withdrawal of the rejection of claim 6.

Claim 7 relates to a system for controlling a blasting network and requires that the communication link in its control mode prevents the at least one designated unsafe message from being transmitted to the assembly of detonators. As previously discussed, in the Wu reference there is no control mode in which the unsafe messages, once generated, are prevented from reaching the assembly of detonators. Therefore, Wu et al. does not teach all the limitations of claim 7 and Applicants respectfully request reconsideration and withdrawal of the rejection of claim 7. Applicants also request reconsideration and withdrawal of the rejection of claims 8, 11, 12, 14, 15, and 16, which depend from and incorporate all the limitations of claim 7.

Claim 18 relates to a method of controlling a blasting network and requires that in the control mode the designated at least one unsafe message is prevented from reaching the assembly of detonators. In the Wu reference there is no control mode in which the unsafe message, once generated, is prevented from reaching the assembly of detonators. Furthermore, claim 18 requires that a locking device is used to place the communication link in its control or operational mode. As previously discussed, the passband filters 60-64 of Wu et al. are able to pass light of the restricted wavelengths (e.g. γ_2), but not light of any other

wavelengths. Since the passband filters do not prevent an unsafe signal from reaching the assembly of detonators, they do not operate as a locking device to place the communication link in the control mode or operational mode. In summary, Wu et al. does not teach all the limitations of claim 18 and Applicants respectfully request reconsideration and withdrawal of the rejection of claim 18.

Claim 20 relates to a system for controlling a blasting network and requires that the communication link in its control mode prevents the at least one designated unsafe message from being transmitted to the assembly of detonators. In the Wu reference there is no control mode in which the unsafe message, once generated, is prevented from reaching the assembly of detonators. Furthermore, claim 20 requires that a locking device is used to place the communication link in its control or operational mode. As previously discussed, the passband filters 60-64 of Wu et al. are able to pass light of the restricted wavelengths (e.g. γ_2), but not light of any other wavelengths. Since the passband filters do not prevent an unsafe signal from reaching the assembly of detonators, they do not operate as a locking device to place the communication link in the control mode or operational mode. In summary, Wu et al. does not reach all the limitations of claim 20 and Applicants respectfully request reconsideration and withdrawal of the rejection of claim 20. Applicants also request reconsideration and withdrawal of the rejection of claim 22, which depends from and incorporates all the limitations of claim 20.

The 35 U.S.C. 103(a) Rejections

Wu et al. in view of Panot et al.

Claims 19, 21 and 23 were rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. in view of U.S. Patent No. 6,101,916 to Panot et al. The Office Action states:

> Referring to claims 19, 21 and 23, Wu et al. discloses a method and system of controlling a blasting network including an assembly of detonators-at 40-44, the blasting network being in a blasting system which further includes a control unit-at 36, and a

communication link-at F, 30-34, C_1-C_n, and 50-54, for transmitting messages between the control unit and the assembly of detonators, the messages consisting of safe and unsafe messages-see for example columns 3-4, the method including the steps of designating at least one message as unsafe-see for example column 3, lines 60-67 and column 4 lines 1-31, placing the communication link in a control mode in which the communication link is monitored for the designated at least one unsafe message in the control mode preventing the designated at least one unsafe message from reaching the assembly of detonators-see for example at 60-64 and in column 3, lines 60-67 and column 4, lines 1-31, and placing the communication link in operational mode in which the designated at least one unsafe message is allowed to reach the assembly of detonators-see for example column 3 lines 60-67 and column 4 lines 1-31, and wherein in both the control mode and the operational mode the safe messages are permitted to be transmitted to the assembly of detonators via the communication link-see for example column 3-4. Wu et al. further discloses the step of designating at least two unsafe messages-see for example column 3 lines 60-67 and column 4 lines 1-31. Wu et does not disclose the control unit is connected to the internet or intranet. Panot et al. does disclose the control unit-at 10, is connected to the internet or intranet-see for example column 7 lines 59-67. Therefore it would have been obvious to one of ordinary skill in the art to take the device of Wu et al. and add the controller connected to the internet of Panot et al., so as to allow for information to be sent to and from the device from a remote location.

Panot et al. relates to a system for aiding the clearing of mines. The system includes a portable processing unit (10) having multimedia capabilities and a software assembly. The software assembly includes software for the management of a data base of various existing mines. As described at col. 7, lines 39-40 and 59-67, the data base may be updated through an Internet connection. The processing unit (10) is connected to a helmet which is worn by a human operator. The operator can use the system of Panot et al. to consult a mine data base and then may take action with respect to a particular mine. Panot et al. does not teach or suggest placing a communication link in a control mode in which the communication link is monitored for the designated at least one unsafe message, in said control mode preventing the designated at least one

unsafe message from reaching the assembly of detonators, and placing the communication link in an operational mode in which the designated at least one unsafe message is allowed to reach the assembly of detonators, and wherein in both the control mode and the operational mode the safe messages are permitted to be transmitted to the assembly of detonators via the communication link.

There is no motivation to combine Wu et al. and Panot et al., since any transmission of messages from a control source unit to a detonator occurs in such a different manner. Wu et al. relates to trigger and detonation system in which messages from the optical source and control are transmitted to an assembly of light trigger or detonation devices via fiber optics. Panot et al. relates to a mine clearing system in which a human operator can consult a mine data base and then may take action with respect to a particular mine.

Furthermore, the combination of references fails to teach or suggest all the limitations of claims 19, 21 and 23. Claim 19 relates to a method of controlling a blasting network and requires that in the control mode the designated at least one unsafe message is prevented from reaching the assembly of detonators. Claims 21 and 23 relate to a system for controlling a blasting network and require that the communication link in its control mode prevents the at least one designated unsafe message from being transmitted to the assembly of detonators. Both singly and in combination, Wu et al. and Panot et al. do not teach or suggest a control mode in which the unsafe message is prevented from reaching the assembly of detonators.

In view of all the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 19, 21 and 23.

Wu et al. in view of MacKellar et al.

Claims 13 and 17 were rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. in view of Mackellar et al., U.S. Patent No. 4,099,467. The Office Action states:

> MacKellar et al. does disclose placing the blasting network in the control and operational modes by means of a switch-at 16 and see for example column 3 lines 12-33. Therefore it would have been obvious to one of ordinary skill in the art to take the device of Wu et al. or Wu et al. as modified by Panot et al. and add the switch of MacKellar et al., so as to allow for the device to be automatically controlled.

MacKellar et al. relates to a method and apparatus for electrically, sequentially activating a sequence of initiators to sequentially initiate a series of explosions. The initiators are electrically actuatable, therefore an electrical signal which causes activation of an initiator can be considered an unsafe message. MacKellar et al. teaches a series of activating modules, each activating module being connected to a power supply. The power supply which supplies electrical power to the activating modules can include various switching means which can prevent transmission of electrical power to the activating means (10). Each activating module also contains a controllable electrically operable switch means. MacKellar does not teach transmission of a safe message to the initiators. Therefore, MacKellar et al. does not teach or suggest placing a communication link in operational and control modes by means of a switch.

Because Wu et al. relates to optical signals and MacKellar et al. relates to electrical signals, modifications not taught in the references would be required for their combination.

Furthermore, the combination of MacKellar et al. and Wu et al. fails to teach or suggest a system in which the communication link allows passage of a safe message to the assembly of detonators in control and operational modes but prevents passage of at least one unsafe message to the assembly of

detonators when placed in control mode. As previously discussed, Wu et al. does not teach or suggest a control mode in which the unsafe message, once generated, is prevented from reaching the assembly of detonators. Since MacKellar et al. does not teach or suggest placing a communication link in operational and control modes by means of a switch, the optical equivalent of the switches of MacKellar et al. also do not place the communication link in operational and control modes. Therefore, substitution of the optical equivalent of the switches of MacKellar et al. into the system of Wu et al. also fails to provide a system which is capable of placing the communication link in operational and control modes. Therefore, the combination of the references lacks all the limitations of claims 13 and 17.

In view of all the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 13 and 17.

Wu et al. in view of Panot et al. and further in view of MacKellar et al.

Claims 13 and 17 were rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. as modified by Panot et al. as applied to claims 20 or 22 above and further in view of U.S. Patent 4.099,467 to MacKellar et al.

There is no motivation to combine the Wu, Panot and MacKellar references, since any transmission of messages from a control source unit to a detonator occurs in such a different manner. Wu et al. relates to trigger and detonation system in which optical messages from the optical source and control are transmitted to an assembly of light trigger or detonation devices via fiber optics. Panot et al. relates to a mine clearing system in which a human operator can consult a mine data base and then may take action with respect to a particular mine. MacKellar et al. relates

to a system for sequentially activating a series of explosions in which electrical messages from a power supply unit are transmitted to initiators.

Furthermore, MacKellar et al., Panot et al. and Wu et al. both singly and in combination fail to teach or suggest a system in which the communication link allows passage of a safe message to the assembly of detonators in control and operational modes but prevents passage of at least one unsafe message to the assembly of detonators when placed in control mode.

In view of all the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 13 and 17.

THE WITHDRAWN CLAIMS

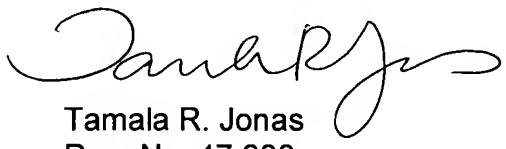
It is believed that the rejections of generic claim 1 have been overcome. Therefore, applicants respectfully request rejoinder of claims 3, 4, 9 and 10, which were withdrawn from consideration.

CONCLUSION

All claims being in condition for allowance, passage to issuance is respectfully requested.

It is believed that a fee of $120 for a one month extension of time is due with this submission and a check for that amount is enclosed. If this amount is incorrect, please credit any overpayment or deduct any required fee, including any fee due for extension of time, from deposit account 07-1969.

Respectfully submitted,



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